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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

DSOUZA, JOSEPH FRANCIS A

ART UNIT	PAPER NUMBER
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2611

NOTIFICATION DATE	DELIVERY MODE
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ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary

Application No.

10/824,395

Applicant(s)

CHEN ET AL.

Examiner

Adolf DSouza

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1 - 11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Drawings

1. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. Applicant has stated that the "circuit described so far is known from prior art" (Specification page 7, line 19), the circuit referring to Fig. 1. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. Claims 4 – 11 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend upon another multiple dependent claim. See MPEP § 608.01(n).

Claim Objections

3. Claim 2 is objected to because of the following informalities: "A method as claim 1" should be changed to "A method as in claim 1". Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 8, 10 – 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 10 and 11 are hybrid claims having both apparatus and method limitations.

Regarding claim 8, the phrase "are derived in such a way" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d). Applicant should be specific about how the signals are derived.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1 – 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peyla et al. (US 6,539,063) in view of Huang et al. (EP 0896457 A1, Symbol

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Synchronization for MCM signals with guard interval; which has been provided by the Applicant in his IDS).

Regarding claim 1, Peyla discloses a method of generating a synchronization pulse representing a symbol boundary (column 2, lines 23 – 42; column 6, line 51 – column 7, line 16) in a signal, the method comprising processing pairs of samples of a received signal which are separated by a period corresponding to the useful part of the symbol (Fig. 3, complex samples 60 input to the circuit; column 6, line 52 – column 7, line 16) by deriving a first signal dependent upon the relationship between the amplitudes of the samples of each pair (Fig. 3, element 195 output; column 11, lines 38 – 51; wherein the first signal is the output of element 195) , a second signal dependent upon the relationship between the phases of the samples of each pair (Fig. 3, element 205; column 12, lines 41 – 53; wherein the second signal is the phase extracted signal) , combining the first and second signals (Fig. 3, element 205, 210; column 12, lines 41 – 53; wherein the combining the first and second signals are done in the block 205) and generating the synchronization pulse in response to the resultant signal changing in a predetermined manner (column 11, lines 5 – 23).

Peyla does not disclose that the symbols are separated by guard bands with data in the guard band being from the useful part of the symbols.

In the same field of endeavor, however, Huang discloses the useful symbol periods separated by guard spaces (Abstract, 1st 3 lines; page 2, lines 16 - 20), with data in

each guard space corresponding to part of the data in a respective useful period (page 2, lines 16 - 20).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Huang, in the system of Peyla because this would allow reduction of ISI, as is well known in the art also disclosed by Huang (page 2, lines 16 - 20).

Regarding claim 2, Peyla discloses the synchronization pulse is generated in response to detecting a change in the resulting signal corresponding to termination of processing of the guard space data of the first of multiple versions of the signal subject to respective different delays (Abstract; column 2, lines 16 – 42; wherein the synchronization detection is the symbol boundary detection and the multiple versions of the signal subject to different delays are the leading and trailing portions).

Regarding claim 3, Peyla discloses the step of low-pass filtering the first signal so as to reduce variations in the value of the first signal for successive sample pairs (Fig. 3, element 145; column 10, lines 56 - 63).

Regarding claim 4, Peyla does not disclose low pass filtering the phase signal.

In the same field of endeavor, however, Huang discloses the step of low-pass filtering the second signal so as to reduce variations in the value of the second signal for successive sample pairs (Fig. 3, element 17; page 4, paragraph 25; wherein the phase value are filtered by the averaging filter 17).

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Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Huang, in the system of Peyla because this would smoothen out the phase signal, as is well known in the art.

Regarding claim 5, Peyla does not disclose detecting high levels of phase difference.

In the same field of endeavor, however, Huang discloses the step of filtering the second signal by tracking values corresponding to relatively high levels of phase difference (Fig. 3, element 16; page 5, paragraphs 29 – 31).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Huang, in the system of Peyla because this would allow for detection of abrupt phase changes, as disclosed by Huang.

Regarding claim 6, Peyla does not disclose applying a filter to the resultant signal.

In the same field of endeavor, however, Huang discloses the step of applying a filter to the resultant signal so as to combine values of the resultant signal with values for corresponding parts of different symbols, and deriving the synchronization pulse from the filtered resultant signal (Fig. 4, element 166; page 5, paragraph 32).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Huang, in the system of Peyla because this would enable interference to be removed, as disclosed by Huang.

Regarding claim 7, Peyla does not disclose using a median filter.

In the same field of endeavor, however, Huang discloses subjecting the resultant signal to a median filter prior to deriving the synchronization pulse (Fig. 4, element 166; page 5, paragraph 32; page 6, paragraph 38).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Huang, in the system of Peyla because this would remove impulse noise from the signal, as is well known in the art.

Regarding claim 8, Peyla discloses the first, second and resultant signals are derived in such a way that the resultant signal can fluctuate at intervals which are substantially shorter than the guard space (Fig. 7a – 7d; wherein the signal fluctuations are as shown in Figs. 7c and 7d).

Regarding claim 9, Peyla discloses a synchronization pulse representing a symbol boundary in an OFDM signal (Abstract; column 2, lines 23 – 42).

Claim 10 is directed to apparatus of the same subject matter claimed in method/steps claim 9 and therefore, is rejected as explained in the rejection of claim 9 above.

Regarding claim 11, Peyla discloses a receiver comprising means for receiving (Fig. 2, element 45) and demodulating a signal (Fig. 2, element 100), the receiver comprising apparatus as claimed in claim 10

Other Prior Art Cited

8. The prior art made of record and not relied upon is considered pertinent to the applicant's disclosure.

The following patents are cited to further show the state of the art with respect to synchronization in OFDM systems:

Huang et al. (US 5,991,289) discloses a synchronization method and apparatus for guard interval-based OFDM signals.

Harikumar et al. (US 20020106035) discloses a spectrally constrained impulse-shortening filter for a discrete multi-tone receiver.

Seki (US 5,602,835) discloses an OFDM synchronization demodulation circuit.

Isaksson et al. (US 5,652,772) discloses a Method and apparatus for synchronization in digital transmissison systems of the OFDM type.

Schmidl et al. (US 5,732,113) discloses timing and frequency synchronization of OFDM signals.

Davies et al. (US 5,953,311) discloses timing synchronization in a receiver employing orthogonal frequency division multiplexing.

Yonge (US 6,074,086) discloses synchronization of OFDM signals with improved windowing.

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Contact Information

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adolf DSouza whose telephone number is 571-272-1043. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


AD


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SUPERVISORY PATENT EXAMINER

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Examiner
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